



Linking the management of climate change adaptation in small coastal towns and cities to the Sustainable Development Goals

David C. Major^{a,*}, Martin Lehmann^b, James Fitton^b

^a Columbia University, Earth Institute, Center for Climate Systems Research, 2880 Broadway 5th Floor, New York NY 10025, USA

^b Department of Planning, Aalborg University, Denmark



ABSTRACT

A new challenge for the management of climate change adaptation in small coastal towns and cities is linking adaptation projects and programs to the United Nation's Sustainable Development Goals (SDGs). These goals provide guidance for a wide range of programs to achieve a sustainable future for a changing world. The development of these goals and their targets and indicators is described, and the challenges and opportunities for coastal managers in linking adaptation projects and programs to them are delineated. Practical approaches to linking climate adaptation to the SDG targets and indicators are proposed. In addition, perspectives are provided on larger issues of relevance to related public policy sectors and the challenges of national aggregation of progress toward the SDGs. The discussion focuses on the very numerous small coastal towns and cities in the world, but the analysis is relevant also to the large wealthy coastal cities active in climate adaptation.

1. Introduction

The United Nation's (UN) transformative Sustainable Development Goals (SDGs) provide guidance for a wide range of programs to achieve a sustainable future for a changing world, including ocean and coastal management. It is important that planning efforts in many sectors be linked to these goals to: move forward toward reaching them; efficiently channel limited resources; help achieve consistency and co-benefits among programs; and indicate the importance that ocean and coastal adaptation planners, implementers and monitors attach to the SDGs. In this essay an important and perhaps insufficiently addressed area of climate action, the adaptation of small coastal towns and cities to climate change, is linked to the SDGs and in particular to SDG 13, “Take urgent action to combat climate change and its impacts.” By making clear the relationship of practical activities, including climate adaptation in small coastal towns and cities, to the SDGs, this linkage provides positive examples to bolster the overall effort to achieve the SDGs and the larger goals, including the eradication of poverty, which the SDGs are intended to serve. The analysis, focused on the numerous small coastal towns and cities in the world, is also relevant to the large, wealthy coastal cities that have taken leading roles in adaptation (Bloomberg, 2011; Major and Juhola, 2016).

The paper has 4 sections in addition to this Introduction: 2, Climate change and adaptation in small coastal towns and cities; 3, Sustainable Development Goals; 4, Linking local coastal climate change adaptation to the SDGs; and 5, Conclusions.

2. Climate change and adaptation in small coastal towns and cities

Climate change has already caused significant impacts on natural and human systems (Intergovernmental Panel on Climate Change, 2014, 2015). In coastal cities, flooding, erosion, salt-water intrusion, and other impacts of sea level rise and storm surge are now affecting populations, assets, and ecosystems and will continue to do so not only from climate change but from trends in urbanization and economic development, especially in developing countries (Intergovernmental Panel on Climate Change, 2014). These factors provide difficult challenges for ocean and coastal management in mitigation, adaptation, and disaster recovery. Small coastal towns and cities, in both developed and developing countries, do not for the most part have the advantages of the well-managed wealthy cities with large engineering and scientific establishments that have taken the lead in urban adaptation to climate change (Major and Juhola, 2016). Partly for this reason, concerted adaptation efforts in the large number of small coastal towns and cities worldwide have lagged behind those of large cities in the developed world. There is thus a significant need for guidance and support for the management of climate adaptation in the very large number of small coastal towns and cities in the world, including the relationship of adaptation in them to the SDGs. Fortunately, because climate change adaptation provides relatively well-defined methods and benefits and costs (positive and negative impacts) on economic, social, and

* Corresponding author.

E-mail addresses: dcm29@columbia.edu (D.C. Major), martinl@plan.aau.dk (M. Lehmann), james@plan.aau.dk (J. Fitton).

environmental objectives, it is possible that it can be used as a template for other types of planning, management and investment decisions in other sectors relating to the SDGs.

3. Sustainable Development Goals

On 1 January 2016, the 17 SDGs of the 2030 Agenda for Sustainable Development, adopted by world leaders in September 2015 at a UN Sustainable Development Summit, officially came into force (United Nations, 2015). Each of the goals has a series of targets, totaling 169 for all of the goals, which in effect are the operational sub-goals of the SDGs. Each of the targets has one or more indicators that serve to show how well that target has been met in a nation; they can thus potentially support a consistent and comparable global monitoring framework. The indicators deal in large part with earlier criticisms of some of the targets as not well defined (e.g. Stokstad, 2015). The resulting indicator set, finalized in 2016, includes a total of 232 distinct indicators, with a few used for more than one target (United Nations, 2016). This array of goals, targets, and indicators, designed to apply to all countries, was developed to help mobilize global efforts to end all forms of poverty, fight inequalities and tackle climate change, while ensuring that no one and no place is left behind.

Implementation and monitoring of the SDGs is integrated into the work of the United Nations system, setting a common agenda for global development efforts within the organization. A number of supplementary initiatives exist to help localize and contextualize the 2030 Agenda. The Sustainable Development Solutions Network (SDSN), an initiative of former UN Secretary General Ban-Ki Moon, "... mobilizes global scientific and technological expertise to promote practical solutions for sustainable development, including the implementation of the Sustainable Development Goals (SDGs) and the Paris Climate Agreement," (<http://unsdsn.org/about-us/vision-and-organization/>) through a global group of networks, each focusing on local, regional, and national implementation and monitoring of the SDGs. There is also the Higher Education Sustainability Initiative (HESI), a partnership of 7 UN offices and divisions that provides an interface with institutions of higher learning (<https://sustainabledevelopment.un.org/sdinaction/hesi>). UN country offices also support national efforts to harmonize governmental priorities and planning with the SDGs. Many of these efforts focus on national level SDG contextualization. Yet, efforts thus far have rarely addressed the local level and specific needs of small coastal towns and cities, where local authorities often play the principal role in the implementation and monitoring of the SDGs.

4. Linking local coastal climate change adaptation to the SDG targets

The roles and contributions of adaptation planners, implementers and monitors relate to what has been called 'localization', i.e. "the process of adapting, implementing, and monitoring the SDGs at the local level" (Kanuri et al., 2016, p. 15). First, the contributions of adaptations to the SDGs focus on their impacts on the targets. This is the first and most direct level of impact; the detailed accounting for and presentation of impacts on the targets will differ for different sectors. The second level, impacts on indicators, is primarily a function of national reporting bodies. These will in principle aggregate the impacts on the targets across sectors and places. Linking climate change adaptation to the targets can be illustrated by considering the first target and its indicators from SDG 13: "Take urgent action to combat climate change and its impacts." This is the SDG of which climate adaptation is a part (it also includes mitigation). The first target and its indicators are shown in Table 1.

Taking as an example an adaptation plan for a single coastal settlement, ocean and coastal managers can report a definite and perhaps significant contribution to Target 13.1. The elements of the plan could be, for example, newly developed evacuation routes as well as new (or

Table 1
SDG 13, target 13.1 and indicators 13.1.1 and 13.1.2

Target	Indicators
13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	13.1.1 Number of countries with national and local disaster risk reduction strategies 13.1.2 Number of deaths, missing persons and persons affected by disaster per 100,000 people

Table note: see Annex for a complete list of targets and indicators for SDG 13.

higher) flood walls. Such a plan would be a contribution to both elements of the target, as it would protect against both climate-related hazards and existing natural disasters (existing storms, for example). Whether there will be a significant national contribution to the indicators will not always be obvious and will depend in large part on national procedures and their treatment of scale. The contribution of a plan for a single settlement may be small, although given national aggregation procedures its contribution will have some effect. On the other hand, if there are effective adaptation plans for all coastal settlements in a nation, then the adaptation planners can make a direct report related to the indicator. This holds also for countries in which a single large coastal city is dominant. From this example, it appears that the task of adaptation planners, implementers and monitors relates to reporting at the first level, the targets, with a subsequent connection to the second level, the national indicators. It should be noted here that the processes both of adaptation and assessing linkages to the SDGs require resources that may be difficult to access for small communities. This is a continuing challenge for both nations and the international community.

The procedures for linking adaptation to the SDGs would then begin with a review of the SDGs, the targets and the indicators to determine which ones would be likely to be significantly impacted by adaptation planning and implementation. As an example, SDG 11, "Make cities and human settlements inclusive, safe, resilient and sustainable," is an SDG that is directly linked to climate change adaptation. Target 11.5 and indicators 11.5.1 and 11.5.2 for SDG 11 are shown in Table 2.

In this example, as with the example of Target 13.1 and Indicators 13.1.1 and 13.1.2, above, climate change adaptation for a particular coastal settlement will impact the elements of the target directly. It could in some cases also impact the indicators directly, but in general the extent to which adaptation will impact the indicators at a national level will depend on national aggregation procedures. In addition to SDGs 13 and 11, the SDGs to which adaptation for climate change of small coastal towns and cities are likely to be most importantly linked include SDGs 6, "Ensure availability and sustainable management of water and sanitation for all"; 9, "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"; 14, "Conserve and sustainably use the oceans, seas and marine resources for sustainable development" (especially avoiding negative impacts on this goal from adaptation measures); and 15, "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss".

However, adaptation is of course linked to substantially all of the SDGs and their targets and indicators, and this poses a task for ocean and coastal adaptation planners, implementers and monitors. Climate change adaptation will impact nearly everything about coastal settlements, but identifying every possible impact, however small, would quickly make the reporting unmanageable and ineffective. It would, for example, be possible to examine a complete matrix relating adaptation to all of the targets and indicators, but most of the cells would be empty or nearly so. Thus, the task of adaptation planners and implementers should be to identify the targets and indicators that adaptation is likely to impact to a significant extent. With experience, a standard set of

Table 2
SDG 11, target 11.5 and indicators 11.5.1 and 11.5.2-.

Target	Indicators
11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	11.5.1 Number of deaths, missing persons and persons affected by disaster per 100,000 people 11.5.2 Direct disaster economic loss in relation to global GDP, including disaster damage to critical infrastructure and disruption of basic services

reporting categories relating the management of climate change adaptation in small coastal towns and cities to the SDGs might be developed, and this could be a standard section in a climate change adaptation report. It should be noted also that data availability at the local level will impact the ability to accomplish this. In many cases, when SDGs are adapted to the local level, governments may create additional targets and indicators to supplement the (often rather broad) targets and indicators of the official SDG monitoring framework. This will depend on local priorities and data availability.

Aligning climate change adaptation to the SDGs has several important advantages that can improve coastal management. By making impacts on the SDGs clear, it will help national entities (such as aid agencies) to organize their efforts in the most effective ways. Further, it will help to align adaptation projects to projects in other sectors, thus providing for potential co-benefits and more efficient funding efforts. It also enables the comparability of adaptation measures across different geographic circumstances.

A further use of the above approach might be as a screening device. If the matrix of impacted targets and indicators is set up for adaptation in general, it could be used to identify particular methods (e.g. evacuation planning, evacuation with refugees, sea walls) that impact more or fewer of the targets and indicators, and could thus help planners to choose among alternative possible adaptation plans.

Finally, larger research issues relate to overall national methods to link projects and programs, such as those for climate change adaptation, to the indicators attached to the SDG targets. In this regard, there is an excellent opportunity to undertake work in this area within the SDSN, where climate initiatives have dealt almost exclusively with mitigation rather than adaptation.

5. Conclusions

This paper is a contribution to linking climate change adaptation for

small coastal towns and cities and other actions to the Sustainable Development Goals. The conclusions of this review are:

1. It should be possible to link climate change adaptation of small coastal towns and cities effectively to the SDG targets and indicators at the local level, with subsequent connections at the national level. This is especially the case because adaptation is based on relatively well defined methods and benefits and costs (positive and negative impacts) on economic, social, and environmental objectives.
2. The next step for adaptation planners, implementers and monitors will be to identify the SDG targets and indicators which adaptation is likely to impact to a significant extent. Once a consistent set of targets and indicators is identified, reporting on the impacts of climate change adaptation on these can be a regular part of the process of climate change adaptation in small coastal towns and cities.
3. This approach can be used as a template for other types of coastal management, planning and investment that have similarly well-defined characteristics, such as transportation. The approach can also be used as a screening device to evaluate alternative adaptation plans in terms of their impacts on the SDGs.
4. Linking climate adaptation to the SDGs will help national entities to organize the management of ocean and coastal adaptation aid more effectively and will also provide for alignment with projects in other sectors, providing potential co-benefits and more efficient funding.

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Annex. Sustainable Development Goal 13: Take urgent action to combat climate change and its impacts*

Targets	Indicators
13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	13.1.1 Number of countries with national and local disaster risk reduction strategies 13.1.2 Number of deaths, missing persons and persons affected by disaster per 100,000 people
13.2 Integrate climate change measures into national policies, strategies and planning	13.2.1 Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)
13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	13.3.1 Number of countries that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions

13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	13.a.1 Mobilized amount of United States dollars per year starting in 2020 accountable towards the \$100 billion commitment
13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	13.b.1 Number of least developed countries and small island developing States that are receiving specialized support, and amount of support, including finance, technology and capacity-building, for mechanisms for raising capacities for effective climate change-related planning and management, including focusing on women, youth and local and marginalized communities

*Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

Annex Table Note: Targets and indicators denoted by letters rather than numbers generally refer to means of implementation (see Weitz et al., 2015, p. 6).

Sources: United Nations, 2015, *Transforming our world: the 2030 Agenda for Sustainable Development*, <https://sustainabledevelopment.un.org/sdgs>, and United Nations 2016, *Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators* (E/CN.3/2017/2), Annex III, Revised list of global Sustainable Development Goal indicators.

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